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ABSTRACT

Three experiments were conducted to test the hypothesis that a paragraph composed of sentences with identical or closely related topics would be easier to read than one whose sentence topics were only remotely related. The first experiment involved subjective judgments by 131 high school students on the readability of two paragraphs identical in subject matter but different in form. The students were alerted before reading that they were going to be judging readability. The second experiment involved 140 high school students and was identical to the first with the exception that the students were not told until after they had read the paragraphs that they were to judge readability. The third experiment was designed to compensate for the possibility that one reading of paired paragraphs might not have allowed the subjects to make a careful judgment of readability. It involved 184 high school students who were allowed to read the paragraphs as many times as they desired within 8 minutes. After 8 minutes, they recorded their opinions concerning the readability of the two paragraphs and commented on the reasons for their decisions. The results of all three experiments supported the hypothesis that a topically linked expository paragraph is more readable than a paragraph in which topics are only remotely related. (FL)

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SUBJECTIVE READABILITY EXPERIMENTS ON TOPICALLY LINKED EXPOSITORY PARAGRAPHS AND THEIR VARIANTS

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Subjective Readability Experiments on Topically Linked Expository Paragraphs and Their Variants

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The research reported here follows up on work described in an earlier essay ("Experiments on the Readability of Natural Expository Paragraphs with Identical or Related Sentence Topics," ED 209 631). In this essay I will report on three experiments. I designed these to test more carefully and thoroughly the hypothesis that a paragraph (called "topically linked") composed of sentences with topics that are identical or closely related to each other or to the information in the sentence comment just before them is more readable than a paragraph (called a "variant") similar or identical to the former in truth value and most other important respects except that the topics of its sentences are related to each other or to the information in the sentence comment just before them only remotely. In most sentences in English texts, the sentence topic usually includes the grammatical subject and its adjuncts; the sentence comment usually includes the complete grammatical predicate or carries primary sentence stress.

Procedures Common to All Experiments

Several procedures marked all three experiments. To ensure that any one topically linked paragraph and its variant differed primarily only in the nature of the information expressed in sentence topics, I constructed pairs of experimental paragraphs almost identical in number of words, clauses, sentences, nominalizations, reversible and non-reversible passives, as well as in

introductory conjunctions, adverbs, and prepositional phrases. Additionally, I tried to make sure that the corresponding sentences in each pair of experimental paragraphs were about the same length and contained many of the same words and full verbs. All pairs of paragraphs corresponded very closely in these ways.

After this was established, a colleague who was familiar with the nature of sentence topics and comments underlined the topics in all the paragraphs. In all cases her judgments agreed with mine.

To ensure that no words or sentences in the experimental paragraphs were markedly awkward, I had several colleagues evaluate them. Usually nine read a topically linked paragraph and nine others read its variant, commenting on any words or sentences that they considered awkward. If any one evaluator objected to a word or sentence, I changed it to what he or she suggested. Therefore, one paragraph in a pair should not have had an advantage in experiments because it contained fewer inappropriate words or awkward sentences than the other.

Finally, I selected and distributed all subjects at random. The order of presentation of paragraphs was always counterbalanced. And once the tests were completed, I analyzed the numerical data with *t*-tests or the normal approximation to the binomial distribution.

Readability Experiment 1: Subjective Judgments of Readability with Subjects Alerted Before a Single Reading

Materials

I used the topically linked paragraph 3a and its variant, 3b.

Paragraph 3a, with its main topics underlined, appears as follows:

> Currently the Trak Marathon is the best waxless ski for recreational cross-country skiing. Its weight is a mere two pounds. Yet its three-inch width allows the skier to break a trail through even the heaviest snow. Its most unique characteristic is the fishscale design for its bottom, an ingenious system for both kick and glide. As a result of this design, the Marathon is almost as effective as most waxable skis. In fact, it is even better than some waxable skis when the snow is very wet. The Marathon can be used with most conventional bindings. However, it works best with the Adidas Suomi. Finally, the Marathon is available in six different colors.

Obviously, in this paragraph the sentence topics are identical or closely related to each other.

The variant of 3a, paragraph 3b, with its main topics underlined, appears as follows:

> Currently the best waxless ski for recreational cross-country skiing is the Trak Marathon. A mere two pounds is its weight. Yet the skier can break a trail through even the heaviest snow with its three-inch width. The fishscale design for its bottom, an ingenious system for both kick and glide, is its most unique characteristic. As a result of this design, most waxable skis are only slightly more effective than the Marathon. In fact, when the snow is very wet, some waxable skis are not as good as it. Most conventional bindings can be used with the Marathon. However, the Adidas Suomi works best with it. Finally, six different colors are available for the Marathon.

In this paragraph, clearly, the sentence topics are only remotely related to each other.

Both of these paragraphs have nine sentences, nine main clauses, one adverbial clause, one reversible passive, the same nominalizations, and the same introductory adverbs, conjunctions, and prepositional phrases. Five sentences in 3a contain the same words as their correspondents in 3b, and two others in 3a are exactly as long as their correspondents.

In some other ways, these two paragraphs are very similar. 3a has 113 words; 3b has 115. None of the sentences in 3a differs

from its correspondent in number of words by more than one, and three of the full verbs in 3a differ from their correspondents only because of changes in number.

The only sentence in the preliminary draft of 3a that my word and sentence evaluators objected to was the fifth. They suggested that I change the preliminary words "it is only slightly less effective than" to "the Marathon is almost as effective as." Some suggested that I change the preliminary version of the sixth sentence of 3b from "some waxable skis are even worse than it" to "some waxable skis are not as good as it."

The evaluators had more comments on individual words in the preliminary drafts. They suggested that I change "skiers" to "skiing," "total weight" to "weight," "softest" to "heaviest," and "fortunately" to "finally."

Subjects and Method

My subjects were seventy-two high-school sophomores and fifty-nine high-school seniors. I told them that they would read two paragraphs identical in subject matter but different in form, that after reading each paragraph once they should indicate on the separate answer sheet whether one paragraph was easier to read or whether they could detect no significant difference in readability between them, and finally, that they should try to justify their decision in writing. Then I gave them a copy of 3a and 3b, which I had prepared nearly identically. I decided which subjects would read one paragraph before the other by flipping a coin and correcting for equal numbers at the end.

Results

I print the results in Table 1. Most subjects chose the topically linked paragraph 3a.

TABLE 1

SUBJECTIVE JUDGMENTS OF READABILITY WITH SUBJECTS ALERTED BEFORE A SINGLE READING

	3a	3b	no difference	z	p
total subjects	86	27	18	3.58	.0002
sophomores	50	16	6	3.30	.0005
seniors	36	11	12	1.69	.05

Readability Experiment 2: Subjective Judgments of Readability with Subjects Alerted After a Single Reading

Materials

Again I used the topically linked paragraph 3a and its variant, 3b.

Subjects and Method

My subjects were seventy-three different high-school sophomores and sixty-seven different high-school seniors. I proceeded exactly as I had in the first experiment except that I waited until immediately after the students had read the paragraphs once to inform them that they should judge readability. If a significant number of students were to favor paragraph 3a, I would have stronger evidence of its greater readability than that provided by the first

experiment because the advantages of 3a must have persisted in memory.

Results

I print the results in Table 2. Again, most subjects preferred paragraph 3a.

TABLE 2

SUBJECTIVE JUDGMENTS OF READABILITY WITH SUBJECTS ALERTED AFTER A SINGLE READING

	3a	3b	n.d.	z	p
total subjects	87	38	15	2.87	.002
sophomores	45	20	8	1.99	.02
seniors	42	18	7	2.08	.02

Readability Experiment 3: Subjective Judgments of Readability After Many Readings

Materials

I used the topically linked paragraph 5a and its variant, 5b. Paragraph 5a, with its main topics underlined, appears as follows:

> Research Writing is probably the most important course for college students. The assignments for this course are three short expository essays and two long and very difficult research papers. Thus the course requires a great deal of students' time. But passing Research Writing is almost synonymous with future success in college. Some of the course's benefits are a greater familiarity with the library and the development of organizational skills, analytic ability, and smooth writing style. Some of its disadvantages are cramped fingers, a sore back, and blood-shot eyes. Research Writing may be taken only by freshmen in the Humanities Division.

Obviously, all the main topics in paragraph 5a are either identical or very closely related to each other.

The variant of 5a, paragraph 5b, with its main topics underlined, appears as follows:

> The most important course for college students is probably Research Writing. Three short expository essays and two long and very difficult research papers are the assignments for this course. Thus a great deal of students' time is required by the course. But future success in college is almost synonymous with passing Research Writing. A greater familiarity with the library, and the development of organizational skills, analytic ability, and smooth writing style are some of the course's benefits. Cramped fingers, a sore back, and blood-shot eyes are some of its disadvantages. Only freshmen in the Humanities Division may take Research Writing.

In this paragraph, the sentence topics are only remotely related to each other.

Paragraphs 5a and 5b both have one hundred words, seven main clauses, seven sentences, one reversible passive, and the same nominalizations and introductory conjunctions. Moreover, five sentences in 5a contain the same words as their correspondents in 5b, and five of the full verbs in 5a are identical to their correspondents in 5b.

Paragraphs 5a and 5b are similar in that none of the sentences in 5a differs from its correspondent in 5b in number of words by more than two and in that the two full verbs in 5a that are not identical to their correspondents in 5b differ only in voice.

My evaluators issued no outright objections to any sentences or words in 5a or 5b. They did, however, suggest that I add some words for greater clarity: "passing" before "Research Writing" in the fourth sentence of both, as well as "and the development of" before "organizational skills" and "style" after "writing" in the fifth sentence of both.

Subjects and Method

This experiment was designed and included primarily to compensate for the possibility that one reading of paired paragraphs (as was the case in each of the first two experiments) might not have allowed subjects to make the most careful judgments of readability. My subjects were 118 high-school sophomores and sixty-six high-school seniors, all of whom had also participated in one or the other of the first two experiments. I gave all subjects a sheet on which paragraphs 5a and 5b appeared. I told them to read the paragraphs as often as they wished within eight minutes. After eight minutes, they had to indicate on the bottom of the sheet whether one paragraph was easier to read, or whether they could detect no significant difference between them in readability. Also, they were supposed to comment on the reasons for their decisions. All subjects finished this task easily.

Results

I print the results in Table 3. A highly significant number of subjects chose 5a.

TABLE 3

SUBJECTIVE JUDGMENTS OF READABILITY AFTER MANY READINGS

	5a	5b	n.d.	z	p
total subjects	121	41	22	4.28	<.0001
sophomores	74	31	13	2.76	.006
seniors	47	10	9	3.45	.0006

General Discussion

These three experiments involving subjective judgments of the relative readability of paragraphs within a pair add evidence to support the hypothesis that a topically linked expository paragraph is more readable than its variant. Looking more closely at the contrasting structures of a topically linked paragraph and its variant, we realize that each sentence in a topically linked form moves from identical or closely related old information to some new information. Each sentence in a variant form, on the other hand, moves from some new information to the identical or closely related old information. Thus these experiments provide evidence that a discourse with sentences moving from old to new information is more readable than a discourse identical in truth value but with sentences moving from new to old information.

Of course, more research is needed to test this finding, especially since these experiments invloved only subjective judgments. But if this finding is supported in the future, that will have important implications for several groups of scholars.

For instance, writing teachers would then have experimental justification for teaching their students to express old before new information whenever possible in sentences. So many students today, perhaps out of impatience, express new before old information in their sentences.

Second, reading teachers and researchers would certainly have another factor of readability to use, one that is different from those involving single words and the syntax of single sentences. And it is possible that they will discover that the ability to relate new to the appropriate old information is an important part

of the process of reading comprehension.

Third, theoretical linguists would probably have to include in their grammars an adequate description of and explanation for the distinction between old and new information.

Finally, cognitive psychologists would have more reason to believe that a strategy identical to or closely resembling Herbert H. Clark and Susan Haviland's given-new strategy of comprehension operates as we comprehend not just pairs of sentences but connected texts. According to them, when we read a sentence we first distinguish its given from its new information, then seek an antecedent in memory for the given information, and finally add the new information into memory at the node occupied by that antecedent. This strategy would explain remarkably well why subjects in the three tests reported here found topically linked paragraphs more readable than their variants. Thus additional research into these matters should be useful for several groups of scholars and their students in several significant ways.